SLOVENSKI STANDARD
SIST EN 15425:2023

01-april-2023

Lepila - Enokomponentni poliuretan (PUR) za nosilne lesene konstrukcije - Razvrstitev in zahtevane lastnosti

Adhesives - One component polyurethane (PUR) for load-bearing timber structures - Classification and performance requirements

Klebstoffe - Einkomponenten-Klebstoffe auf Polyurethanbasis (PUR) für tragende Holzbauteile - Klassifizierung und Leistungsanforderungen

Adhésifs - Adhésifs polyuréthane monocomposants (PUR) pour structures portantes en bois - Classification et exigences de performance

Ta slovenski standard je istoveten z: EN 15425:2023

ICS:

83.180	Lepila	Adhesives
91.080.20	Lesene konstrukcije	Timber structures

SIST EN 15425:2023 **en,fr,de**

EUROPEAN STANDARD

NORME EUROPÉENNE

EUROPÄISCHE NORM

EN 15425

February 2023

ICS 83.180

Supersedes EN 15425:2017

English Version

Adhesives - One component polyurethane (PUR) for load-bearing timber structures - Classification and performance requirements

Adhésifs - Adhésifs polyuréthane monocomposants (PUR) pour structures portantes en bois - Classification et exigences de performance

Klebstoffe - Einkomponenten-Klebstoffe auf Polyurethanbasis (PUR) für tragende Holzbauteile - Klassifizierung und Leistungsanforderungen

This European Standard was approved by CEN on 18 December 2022.

CEN members are bound to comply with the CEN/CENELEC Internal Regulations which stipulate the conditions for giving this European Standard the status of a national standard without any alteration. Up-to-date lists and bibliographical references concerning such national standards may be obtained on application to the CEN-CENELEC Management Centre or to any CEN member.

This European Standard exists in three official versions (English, French, German). A version in any other language made by translation under the responsibility of a CEN member into its own language and notified to the CEN-CENELEC Management Centre has the same status as the official versions.

CEN members are the national standards bodies of Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and United Kingdom.

EUROPEAN COMMITTEE FOR STANDARDIZATION
COMITÉ EUROPÉEN DE NORMALISATION
EUROPÄISCHES KOMITEE FÜR NORMUNG

CEN-CENELEC Management Centre: Rue de la Science 23, B-1040 Brussels

Ref. No. EN 15425:2023 E

Contents

Page

European foreword

This document (EN 15425:2023) has been prepared by Technical Committee CEN/TC 193 “Adhesives”, the secretariat of which is held by UNE.

This European Standard shall be given the status of a national standard, either by publication of an identical text or by endorsement, at the latest by August 2023, and conflicting national standards shall be withdrawn at the latest by August 2023.

Attention is drawn to the possibility that some of the elements of this document may be the subject of patent rights. CEN shall not be held responsible for identifying any or all such patent rights.

This document supersedes EN 15425:2017.

EN 15425:2023 includes the following significant technical changes with respect to EN 15425:2017:

a) for adhesive type “Special purpose”, the test according to EN 302-8 is performed with a bond line thickness of 0,5 mm;

b) an additional adhesive subtype I-SP-70-0,5 has been added in Table 1;

c) for adhesive type FJ, the test according to EN 302-2 is required only with short closed assembly time, and the test according to EN 15416-5 is only required with thin glue line;

d) for finger joint delamination tests on additional wood species, the reference to EN 301 has been replaced by a new Annex B;

e) for the delamination test according to EN 302-2 with preservative treated wood, a test with Scots pine (*Pinus sylvestris*) and silver fir (*Abies alba*) covers also Norway spruce (*Picea abies* L.);

f) the description of the test procedure for an “adhesive line” has been modified;

g) the description of a test procedure when a primer is used in all bonding operations has been added in Clause 4;

h) provisions and maximum tolerance for testing and application of a primer have been added in 5.1;

i) information on water spraying has been included in the scope and as a new Annex C.

Any feedback and questions on this document should be directed to the users’ national standards body. A complete listing of these bodies can be found on the CEN website.

According to the CEN-CENELEC Internal Regulations, the national standards organisations of the following countries are bound to implement this European Standard: Austria, Belgium, Bulgaria, Croatia, Cyprus, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Norway, Poland, Portugal, Republic of North Macedonia, Romania, Serbia, Slovakia, Slovenia, Spain, Sweden, Switzerland, Türkiye and the United Kingdom.

Introduction

This document is one of a series dealing with one component polyurethane adhesives for use with timber structures, and is published in support of product standards for load-bearing timber structures in connection with EN 1995-1-1, *Eurocode 5: Design of timber structures — Part 1-1: General — Common rules and rules for buildings*.

The series consists of:

— one standard for classification and performance requirements (EN 15425);

— eight test methods (EN 302-1, EN 302-2, EN 302-3, EN 302-4, EN 302-8, EN 15416-1 ("Glass house test"), EN 15416-3 and Annex B of this document) used to assess the performance of adhesives after specified heat and humidity treatments; and

— three test methods (EN ISO 2555 (reference in EN 302-7), EN 15416-4, and EN 15416-5) to characterize the working properties of the adhesives.

Safety statement

Persons using this document should be familiar with the normal laboratory practice, if applicable. This document cannot address all of the safety problems, if any, associated with its use. It is the responsibility of the user to establish appropriate safety and health practices and to ensure compliance with any regulatory conditions.

Environmental statement

It is understood that some of the material permitted in this document may have negative environmental impact. As technological advantages lead to better alternatives for these materials, they will be eliminated from this European Standard to the extent possible.

At the end of the test, it is recommended that the users of this document take care to carry out an appropriate disposal of the wastes, according to local regulations.

1 Scope

This document establishes a classification for one component polyurethane (PUR) adhesives according to their suitability for use in load-bearing timber products in defined climatic exposure conditions, and specifies performance requirements for such adhesives for the factory manufacture or factory-like manufacturing of load-bearing timber products only.

It also classifies "adhesive product lines" where all the products within the line have the same chemical composition except for a different amount of catalyst.

This document only specifies the performance of adhesives for use in an environment corresponding to the defined conditions.

The performance requirements of this document are applicable to the adhesives only, not to the manufactured timber products. This document does not cover the performance of adhesives for on-site gluing (except for factory-like conditions) or the production of wood-based panels, except solid wood panels, or modified and stabilized wood with considerably reduced swelling and shrinkage properties, e.g. acetylated wood, heat treated wood and polymer impregnated wood.

This document is primarily intended for use by adhesive manufacturers and for use in timber products bonded with adhesives, to assess or control the quality of adhesives. The requirements are applicable to the type testing of the adhesives. Production control activities are outside the scope of this document.

Adhesives meeting the requirements of this document are adequate for use in load-bearing timber products, provided that the bonding process has been carried out according to an appropriate product standard.

This document does not address the classification and use of adhesives in combination with the spraying of water before or during the bonding process; see informative Annex C of this document.

This does neither allow nor forbid the use of adhesives in combination with the spraying of water.

2 Normative references

The following documents are referred to in the text in such a way that some or all of their content constitutes requirements of this document. For dated references, only the edition cited applies. For undated references, the latest edition of the referenced document (including any amendments) applies.

EN 302-1, *Adhesives for load-bearing timber structures — Test methods — Part 1: Determination of longitudinal tensile shear strength*

EN 302-2, *Adhesives for load-bearing timber structures — Test methods — Part 2: Determination of resistance to delamination*

EN 302-3, *Adhesives for load-bearing timber structures — Test methods — Part 3: Determination of the effect of acid damage to wood fibres by temperature and humidity cycling on the transverse tensile strength*

EN 302-4, *Adhesives for load-bearing timber structures — Test methods — Part 4: Determination of the effects of wood shrinkage on the shear strength*

EN 302-8, *Adhesives for load-bearing timber structures — Test methods — Part 8: Static load test of multiple bond line specimens in compression shear*

EN 923, *Adhesives — Terms and definitions*

EN 13183-2, *Moisture content of a piece of sawn timber — Part 2: Estimation by electrical resistance method*

EN 13183-3, *Moisture content of a piece of sawn timber — Part 3: Estimation by capacitance method*

EN 14080, *Timber structures — Glued laminated timber and glued solid timber — Requirements*

EN 15416-1, *Adhesives for load bearing timber structures other than phenolic and aminoplastic — Test methods — Part 1: Long-term tension load test perpendicular to the bond line at varying climate conditions with specimens perpendicular to the glue line (Glass house test)*

EN 15416-3, *Adhesives for load bearing timber structures other than phenolic and aminoplastic — Test methods — Part 3: Creep deformation test at cyclic climate conditions with specimens loaded in bending shear*

EN 15416-4, *Adhesives for load bearing timber structures other than phenolic and aminoplastic — Test methods — Part 4: Determination of open assembly time under referenced conditions*

EN 15416-5, *Adhesives for load bearing timber structures other than phenolic and aminoplastic — Test methods — Part 5: Determination of minimum pressing time under referenced conditions*

EN ISO 2555, *Plastics — Resins in the liquid state or as emulsions or dispersions — Determination of apparent viscosity using a single cylinder type rotational viscometer method (ISO 2555)*

3 Terms and definitions

For the purposes of this document, the terms and definitions given in EN 923 and the following apply.

ISO and IEC maintain terminology databases for use in standardization at the following addresses:

— ISO Online browsing platform: available at https://www.iso.org/obp

— IEC Electropedia: available at https://www.electropedia.org/

3.1
one component polyurethane (PUR) adhesive
isocyanate containing urethane polymers, which are cross-linked by reaction with water

3.2
service class 1
climatic conditions characterized by a moisture content in the materials corresponding to a temperature of 20 °C and the relative humidity of the surrounding air only exceeding 65 % for a few weeks per year

Note 1 to entry: In service class 1, which comprises typical indoor conditions, the average moisture content in most soft woods will not exceed 12 %.

[SOURCE: EN 1995-1-1:2004, 2.3.1.3, modified – Indoor conditions have been added in Note 1 to entry.]

3.3
service class 2
climatic conditions characterized by a moisture content in the materials corresponding to a temperature of 20 °C and the relative humidity of the surrounding air only exceeding 85 % for a few weeks per year

Note 1 to entry: In service class 2, to which most covered exterior conditions belong, the average moisture content in most soft woods will not exceed 20 %.

[SOURCE: EN 1995-1-1:2004, 2.3.1.3, modified – Covered exterior conditions have been added in Note 1 to entry.]

3.4
service class 3
climatic conditions leading to higher moisture contents than in service class 2

Note 1 to entry: Exterior conditions typically belong to service class 3.

[SOURCE: EN 1995-1-1:2004, 2.3.1.3, modified – Note 1 to entry has been added.]

3.5
glue line
adhesive layer between the wood members

3.6
bond line
glue line including the two intermediate zones between adhesive and wood

3.7
close contact glue line
glue line of thickness maximum 0,1 mm

Note 1 to entry: Close contact glue line can be achieved by pressing together two plane wood members with a clamping pressure of (0,8 ± 0,1) N/mm² without additional groves, spacers or similar devices.

3.8
thick glue line
glue line of nominal thickness in the range of 0,3 mm to 1,0 mm at the time of bonding

Note 1 to entry: Thick glue lines are achieved by using spacers, grooves or similar devices when two plain members are glued together.

3.9
adhesive product line
series of products, all with the same chemical composition except for a different amount of catalyst

Note 1 to entry: Only for this reason the products have different reactivity.

3.10
primer treatment
application of a coating (primer) substance to both adherend surfaces, prior to the application of an adhesive to improve adhesion and/or durability of the bond

Note 1 to entry: This does not include application of pure water.

4 Classification

Adhesives for structural purpose shall produce joints of such strength and durability that the integrity of the bond is maintained in the assigned service class throughout the expected life of the structure.

PUR-adhesives according to EN 15425 are classified by type (climate condition in use), maximum test temperature and maximum glue line thickness in use. These three classification criteria are subdivided as follows.

Type I: to be used in service classes 1, 2 and 3.

Type II: to be used in service class 1 only.

Maximum test temperature: 50 °C, 70 °C or 90 °C.

Maximum glue line thickness in use: 0,1 mm, 0,3 mm and 0,5 mm.

Depending on the maximum glue line thickness in use, the adhesives are assigned to different application areas as described below and shown in Table 1.

— **Special purpose adhesives (SP)**: to be used for glue lines between laminations (maximum glue line thickness 0,5 mm) and for finger-joints in laminations and structural timber.

— **General purpose adhesives (GP)**: to be used for glue lines between laminations (maximum glue line thickness 0,3 mm) and for finger-joints in laminations and structural timber.

— **Finger-jointing adhesives (FJ)**: to be used for finger-jointing of laminations and structural timber only (maximum glue line thickness 0,1 mm).

NOTE The definition of "Special purpose", "General purpose" and "Type" can be different in other standards.

Each area of application and use shall be given in the designation code of the adhesive.

Table 1 — Adhesive classes

Adhesive class (designation code)	Application area	Max. test temperature[a]	Max. glue line thickness		Service classes[b]
			Test	Use	
		°C	mm	mm	
	Normal use				
EN 15425 I 70 GP 0,3	General purpose	70	0,5	0,3	1, 2, 3
	Special use				
EN 15425 I 90 SP 0,5	Special purpose	90	1,0	0,5	1, 2, 3
EN 15425 I 70 SP 0,5	Special purpose	70	1,0	0,5	1, 2, 3
EN 15425 I 90 GP 0,3	General purpose	90	0,5	0,3	1, 2, 3
EN 15425 I 90 FJ 0,1	Finger-jointing	90	0,3	0,1	1, 2, 3
EN 15425 I 70 FJ 0,1	Finger-jointing	70	0,3	0,1	1, 2, 3
EN 15425 II 50 GP 0,3	General purpose	50	0,5	0,3	1
EN 15425 II 50 FJ 0,1	Finger-jointing	50	0,3	0,1	1

[a] Tested according to EN 302-8 and Annex A, designation A6, A7 or A8.

[b] The application of the adhesive types in the different service classes can be restricted by national regulations applicable at the end use site of the bonded timber structures.

A classification to a certain "maximum test temperature" will automatically be valid for lower temperatures.

Table 2 specifies the tests that shall be performed for each application area. References are given to the actual subclause in this document and to the European Standard the tests are based on.